REMARKS

Claims 1 through 20 are pending. Claim 4 has been amended to conform the amended elements to their antecedents. These amendments are not related to patentability.

All of the claims were rejected based upon art. The following comments track the sequence of the rejections.

Claim Objections

Claim 4 was objected to because the elements "the voltage difference squared" and "the current squared" in lines 5 and 6 did not agree with their antecedents in lines 3 and 4. The amendments to Claim 4 correct this error. These amendments do not affect patentability.

Claim 8 was objected to on the ground that "zero crossing" is not defined in the specification. The term "zero crossing" does not appear in Claim 8. It appears that the objection was intended to be made with regard to Claim 9. The term "zero crossing of the difference between the first and second AC voltage" appearing in lines 4 and 5 of Claim 9 is defined in the specification at page 6, lines 24 and 25, as the point where the difference is voltage changes polarity. The term "close to zero crossing of the AC current" in the last line of Claim 9 is defined at page 6, lines 25-27, as " the sample of current closest to the samples making up the zero crossing of the difference at which the current changes polarity". Thus, the cited terms are appropriately defined in the specification.

Rejection of Claims Under 35 USC § 102

Claims 1, 2 and 14 were rejected under 35 USC § 102(b) as being anticipated by Vokey et al., US 4,947,469. This rejection is respectfully traversed.

Claim 1 is directed in pertinent part to a method of determining impedance across a pressure junction in a section of an energized power distribution system using the energizing power. It comprises the steps of measuring a first voltage produced by the energizing power at a first end of the section of the energized power system, measuring a second voltage produced by the energizing power at the second end of the energized power system; measuring current produced by the energizing power and determining the impedance as the difference between the first and second voltages divided by current. The main thrust of Claim 1 is a method for measuring the impedance across a pressure junction of an energized power distribution system using the energizing power. No separate test signals are required.

Vokey et al. is directed to locating a fault on a cable by measuring the resistance as seen from opposite ends of the cable. This is quite distinct from measuring the impedance across a pressure junction and involves a different process. It requires two separate DC power supplies to generate test signals that are injected into each end of the cable. It also requires

apparatus for measuring voltage and current at each end of the cable. Vokey et al. is not directed to measuring the impedance across a pressure junction in the power distribution system. Instead it measures the distance to a fault on a cable. Furthermore, it does not measure voltage or current produced as called for in Claim 1 by the energizing power in an energized power distribution system, which is defined in Applicant's specification at page 2, lines 4 and 5, as "a system delivering power". Instead Vokey et al. applies a test voltage to the cable. In fact, Vokey et al. first applies a test voltage at one end of the cable and then a second test voltage at the other end. This requires two separate power supplies 18A and 18B. Furthermore, Vokey et al. measures the current at each end of the cable, thus requiring two current meters 16A and 16B. In the Vokey et al. technique, the first test voltage is applied to one end of the cable followed by the measurement of the voltage at both ends and current at the one end. Vokey et al. then requires application of the second test voltage at the other end of the cable and measurement of the voltage at both ends and current at that other end. These measurements are then used to calculate the distance to the fault using various formulae.

Clearly, Vokey et al. uses different steps that operate in a different way to achieve a different result from the method of Claim 1, and therefore, the reference does not anticipate Claim 1.

Claim 2 is dependent from Claim 1 and is therefore patentable over Vokey et al. for the same reasons.

Claim 14 is directed to apparatus for determining the impedance across a pressure junction in a section of an energized power distribution system using the energizing power. The apparatus comprises, in pertinent part: first and second voltage measuring means for measuring voltage generated by the energizing power at the first and second ends of the section of the energized power distribution system, current measuring means measuring the current through the section of the energized power distribution system and means determining impedance by dividing a difference between the voltages by the current. This claim is not anticipated by Vokey et al. for the same reasons discussed in connection with Claim 1 above.

Rejections Under 35 USC § 103

Claims 3-8, 13 and 15-20 were rejected under 35 USC § 103(a) as being unpatentable over Vokey et al. in view of Godo et al., US 6,225,810.

Claim 3 depends from Claim 1 through Claim 2 and adds that measurement of the voltages and current are performed substantially simultaneously. The rejection asserts that Vokey et al. discloses the method of determining the impedance by measuring the voltages and current but does not disclose the distribution system as an alternating current system or that the

voltages and current are sampled substantially simultaneously. Godo et al. is relied upon in the rejection to show these latter features.

Claim 3 depends from Claim 1 and is therefore patentable for the same reasons. As mentioned above, Vokey et al. does not, among other things, teach a method for determining the impedance across a pressure junction in a section of an energized power distribution system using the energizing power. Godo et al. is directed to a loop resistance tester for testing shielded cable for integrity. Godo et al. requires connecting the shield to an aircraft structure to create a loop, then inducing a signal in the loop through electromagnetic coupling. This reference uses a drive coupler to inject a test signal into this loop. It does not use energizing power, but instead a test signal generator. See column 5, line 60 and subsequent. This test signal generator generates a low power signal as described in the abstract. Clearly, it does not use energizing power and does not measure impedance across a pressure junction.

Accordingly, combining the teachings of Godo et al. with Vokey et al. does not make up for the deficiencies in the teachings of Vokey et al. with regard to using the energizing power in an energized power distribution system to determine the impedance across a pressure junction in a power distribution system. Hence, Claim 3 is not obvious in view of any combination of Vokey et al. and Godo et al. whether taken singly or in combination.

Claim 4 depends from Claim 1 through Claim 2 and is therefore patentable for the same reasons. Furthermore, Claim 4 calls for summing a squared difference between the first voltage and second voltage to generate a summed voltage difference squared and summing the current squared to generate a summed current squared and dividing the summed voltage difference squared by the summed current squared to generate a representation of the impedance. Godo et al. was cited as disclosing the summing of the voltages squared citing Column 5, lines 2-3 in Equation 5 and summing the current squared citing Column 4, line 55 in Equation 6. Equations 5 and 6 of Godo et al. illustrate two different ways of determining the loop resistance. The first equation uses a sum of voltages squared as part of the equation but does not include a current squared term. On the other hand, Equation 5 uses a summation of a current squared term but does not incorporate a voltage squared term, let alone a sum of a voltage squared term. This rejection is based upon an improper selection of terms from two different equations to arrive at an equation that is not disclosed or in anyway suggested by the reference. Also, as mentioned in connection with Claim 3, Godo et al. does not make up for the deficiencies in Vokey et al. with regard to the basic method called for in Claim 1 from which Claim 4 depends. Accordingly, Claim 4 is not obvious in view of Vokey et al. and Godo et al. whether taken singly or in combination.

Claims 5 through 8 all depend from Claim 4 and are therefore patentable for the same reasons. In addition, Claim 5 calls for limiting changes in the successive values of impedance calculated. Neither of the references suggests this feature and, therefore, Claim 5 further patentably distinguishes over the references. Claim 6, which depends from Claim 5, calls for the limiting of changes in successive values of impedance to comprise changing the impedance into a preceding value of the impedance plus a value X when the impedance is more than the preceding value of the impedance and changing the impedance to the preceding value of impedance minus the value of X when the impedance is less than the preceding value of impedance. The rejection states that:

> "Godo et al. further discloses replacing the preceding value of the impedance by adding a value (column 3, line 26, eq. 3)."

On the contrary, Equation 3 in Godo et al. merely states that the impedance being determined has two components that are added together. This formula does not require successive calculations but only a single calculation and there is no adjustment for successive calculations. There is no term in Equation 3 of Godo et al. for successive calculations of an impedance. Therefore, the combination of Vokey et al. and Godo et al. does not render Claim 6 obvious.

Claim 7 depends from Claim 6 and further describes how the change in impedance is limited. Clearly, the references do not suggest this method.

Claim 8 depends from Claim 4, and further calls for the power distribution system to be an AC system and for the measurements to be taken so as to eliminate any power factor in the energizing AC power. Neither Vokey et al. nor Godo et al. address this issue and therefore Claim 8 further patentably distinguishes over these references.

Claim 13 depends from Claim 1 and is therefore patentable for the same reasons.

Claims 15-20 are apparatus claims which all depend from Claim 14 and are therefore patentable for the same reasons. Claim 15 adds limitations similar to those in Claim 3, and therefore further patentably distinguishes for the same reasons.

Claim 17 distinguishes over Vokey et al. and Godo et al. for reasons similar to those discussed in connection with Claim 4. Claims 18, 19 and 20 distinguish over the references for reasons similar to those discussed in connection with Claims 5-7.

No specific rejection was made of Claim 9, but it depends from Claim 1 through Claims 4 and 8 and therefore is patentable for all the same reasons.

Claims 10 and 11 were rejected under 35 USC § 103(a) as being unpatentable over Vokey et al. in view of Ball, US 4,954,782.

Claims 10 and 11 depend from Claim 1 and are therefore patentable for the same reasons. Claim 10 adds to Claim 1 that the current is measured by taking two spaced apart AC voltage measurements at two spaced apart points not separated by the pressure joint, between which a fixed impedance is known and dividing the different between the two spaced apart voltage measurements by the known fixed impedance.

The Office Action asserts that Vokey et al. discloses taking two spaced voltage measurements at two spaced apart points not separated by a pressure joint. Vokey is not at all concerned with pressure joints, let alone measuring the impedance across a pressure joint. The Office Action then concedes that Vokey et al. does not disclose dividing the difference between the two spaced apart voltage measurements by the known fixed impedance. Ball is asserted to disclose "a known fixed impedance Rr through which current Is through a pressure joint flows". Ball also is not in anyway related to measuring the impedance across a pressure joint. It is directed to a four terminal bridge circuit utilizing a reference resistance Rr of known resistance. This apparatus is used to determine the unknown resistance of the resistor Rx. The bridge circuit of which the reference resistor Rr is a part is a test circuit; it is not part of a power distribution system and test signals are used in this bridge circuit, not energizing power in a power distribution system. Thus, Ball does not make up for the deficiencies in the basic teaching of Vokey et al. discussed in connection with Claim 1, and consequently, the references, whether taken singly or in combination, do not render the subject matter of Claim 10 obvious.

As Claim 11 depends from Claim 10, it is further patentable for the same reasons.

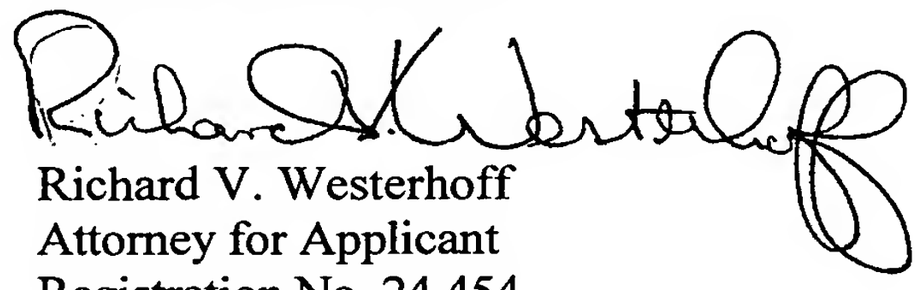
Claim 12 was rejected under 35 USC § 103(a) as being unpatentable over Vokey et al. in view of Ball, further in view of Haun et al. US 6,477,021.

Claim 12 depends from Claim 1 through Claims 10 and 11 and is therefore patentable for all of the same reasons. Furthermore, Claim 12 adds that at least one of the first voltage, the second voltage, and the current is measured using devices provided in the power distribution system selected from the specified group including circuit breakers. Vokey et al. is cited as disclosing the measurements called for but it is conceded that it does not disclose the specified group of components. Haun et al. is cited as disclosing this group of components (while Ball was cited in the rejection, no teachings were applied with regard to Claim 12). Claim 12 calls for the specified components in the

electric power distribution system to be used to perform at least one of the steps set forth in the claimed method, as set forth in Claims 1, 10 and 11. Haun et al. merely describes a circuit breaker in the form of an arc fault circuit interrupter, which it is conceded is known. Claim 12 calls for these known components that are already provided in a power distribution system to be used to perform certain of the steps of the claimed method. Haun et al. in no way suggests that a circuit breaker, such as an arc fault current interrupter, be used to make measurements for determining the impedance of a pressure joint in an energized power distribution system using the energizing power. It provides no teaching which makes up for the deficiencies of Vokey et al. in this regard, and therefore, Claim 12 further patentably distinguishes over any combination of Vokey et al. and Haun et al., with or without Ball.

In view of all the above, reconsideration and allowance of the application as now presented is respectfully solicited.

Respectfully submitted,



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